Disparities Within: Unequal Spending and Achievement in an Urban School District

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The debate over whether educational spending shapes achievement has persisted for decades, largely because of methodological and analytical limitations associated with the use of district-level data. In this study, the authors analyzed unique within-district variations in spending and achievement among 89 public elementary schools in a large, North Central, urban district. The analyses reveal considerable disparities in spending within the district, which are linked to local patterns of racial and class stratification and concentration. They show how these locally driven inequalities and their links to specific school resources have consequences for achievement in five distinct subject areas. The authors conclude by discussing the implications of their findings for understanding the local production of class and racial educational inequality and recent moves toward resegregation that are evident in many U.S. cities.

D espite decades of research and public policy debates on the topic, it is still unclear whether educational spending influences students' achievement. Some studies have suggested that there are no apparent effects of spending, while others have found that educational dollars indeed make a difference (see Burtless 1996). These debates and the research from which they have drawn have been limited for several reasons, not the least of which is the reliance on district-level data on spending (Farland 1997; Picus 1997).

In this article, we extend the literature on educational spending and achievement by presenting our study, which analyzed the extent of variation in spending, its potential causes, and its consequences for students' achievement across 89 elementary schools within one urban school district. These unique, within-district, school-level data allowed us to delineate (1) significant within-district inequality in spending and its consequences for achievement; (2) the extent to which the disparities are associated with larger patterns of racial and class inequality and

concentration; and (3) how spending matters, that is, the mechanisms that mediate the link between spending and achievement. We conclude this article by discussing the implications of our findings for understanding the dynamics of local stratification, school inequality, and depressed patterns of achievement that are evident in many urban areas of the United States.

BACKGROUND: SPENDING AND ACHIEVEMENT

The American system of public education is one in which the amount of wealth in a school district shapes the quality of its schools (Kozol 1991; Slavin 1999). Because American schools are funded primarily by local property taxes, the wealthiest districts spend as much as three times the per-pupil amount of the most economically disadvantaged districts. In recent years, courts have recognized this reality and have ruled that systems of

funding public schools that rely heavily on local property taxes are unconstitutional (Burke 1999; Goertz and Edwards 1999; Slavin 1999).

Although traditional funding schemes ensure that economically advantaged students attend schools that tend to be physically superior to those of poor students, it is less clear whether more spending leads to higher academic achievement. Studies by educational researchers, economists, and sociologists have come to conflicting conclusions on whether "money matters." Some studies have found that higher spending promotes achievement (Elliott 1998; Hedges and Greenwald 1996; Hedges, Laine, and Greenwald 1994; Wenglinsky 1997, 1998), while others have suggested that money matters little, particularly once a number of other factors are taken into consideration (Hanushek 1989, 1994, 1996). This body of literature, often referred to as "production-function" research, is concerned mainly with whether inputs, such as spending, directly result in positive outputs, such as achievement.

A number of meta-analyses have been undertaken to attempt to clarify the association. Hanushek (1989:47), for instance, conducted a meta-analysis of hundreds of production-function studies and concluded that "there is no strong or systematic relationship between school expenditures and student performance" (see also Hanushek 1994, 1996). In an exchange between Hedges et al. (1994) and Hanushek (1994) in the *Educational Researcher*, Hedges et al. presented contrasting results derived from their own meta-analysis of a similar body of production-function research. In contrast to Hanushek (1994:8), who maintained that "throwing money at schools" would be a poor policy decision, they contended that "money *does* matter after all" (p. 13). Wenglinsky (1997:223) summed up the results of production-function research and meta-analyses, suggesting that "the results . . . have been mixed, fueling, rather than resolving, the debate on whether money matters to achievement." More recent work, as a consequence, has shifted from the question of *whether* money matters to *how* money may

promote achievement through the purchase of specific resources.

Wenglinsky (1997) identified several financially driven factors that improve a school's "social environment." For example, instructional per-student expenditures appear to increase teacher-student ratios and boost teachers' credentials. Expenditures on central administration also seem to shape teacher-student ratios, possibly indicating that "a well-supported central administration makes better decisions about the allocation of resources that lead to improved teacher-student ratios" (p. 225). Mosteller (1995) highlighted the importance of smaller classes, and Elliott (1998) found that spending promotes achievement through the hiring of highly educated teachers who have regular access to resources, such as computers and science equipment. Finally, Verstegen and King (1998) discussed several studies that found that the quality of teachers, class size, and spending are all important predictors of achievement. Thus, while past research failed to come to a definite conclusion as to whether financial resources are directly linked to achievement, more recent work has clearly suggested that specific attributes of schools may be important mediators between spending and achievement.

ADDRESSING LIMITATIONS OF PREVIOUS RESEARCH

Why is there still a debate over the impact of money on students' achievement? We believe that the answer is partially analytic. The use of district-level data on spending, we suggest, limits the capacity of researchers to measure true variation in spending among schools, leaves the causes of unequal spending unexamined, and disallows the inclusion of key school-level measures that arguably mediate the spending-achievement relation.

Level of Analysis

Perhaps the most important limitation of prior work has been the reliance on district-level data on spending. When the effects of

various attributes of students and schools on achievement are assessed, each student in a sample typically carries the per-student spending figure for his or her district. Although the use of these data may capture more aggregate spatial disparities, it is problematic, given the considerable variation in spending *among schools within a given district*. In our study, for instance, total per-student spending among elementary schools within the district ranged from $3,045 to $8,165. If students in these schools were included in a sample that used figures on district-level spending, the average per-student figures would be about $5,000. In reality, however, in the vast majority of cases, the figures are far higher or lower.

District-level analyses, while certainly useful, overlook the fact that schools within districts are often allocated different amounts of financial and material resources via local school board decisions. Thus, the more proximate variation in spending for students may be masked in such studies. Even some more recent sociological analyses of spending and achievement have treated students as the unit of analysis, yet have been compromised by data on spending that were aggregated to the district level (see, e.g., Roscigno 1998; Wenglinsky 1997, 1998). It is plausible that estimates of the effects of spending, using district-level figures, are inaccurate and may be underestimated.

This limitation of prior work is undoubtedly a function of the availability of data. Researchers have recognized that district-level spending measures are not preferable, but have also noted that school-level data are difficult to find. Monk (1981:223), for example, pointed out that the study of the distribution of resources among schools has been limited partly because of "the general lack of program and building level financial records." Wenglinsky (1998:273) used the Common Core of Data as a source of data on district-level spending because "such information is not available at the school level." Similarly, Unnever, Kerckhoff, and Robinson (2000:248) noted that the state they studied "does not collect data that would allow [them] to replicate [their] analysis at the school or individual level."

Recent efforts have been directed toward collecting and using *school-level* spending measures. In fact, the entire Winter 1997 issue of the *Journal of Education Finance* was dedicated to a discussion of the potential value of school-level data. Financially driven resources, such as class size, the quality of teachers, curriculum, and learning materials, can vary widely from one school and even one classroom to another. It is suggested that school-level data may allow for more effective analyses of the role of money and other resources in promoting achievement by moving the level of analysis to a more proximate level, where students actually learn (Berne, Stiefel, and Moser 1997; Farland 1997; Goertz 1997; Picus 1997).

The Roots of Variation in Spending

Disparities in spending may be related to broader patterns of social stratification and concentration, a possibility that has received little, if any, systematic attention in the recent literature. Indeed, a handful of studies, conducted in the 1960s and 1970s, found that several money-related school resources were lacking in poor and minority schools relative to white and higher-socioeconomic status (SES) schools in large urban districts. These missing resources included physically sound buildings (Owen 1972; Sexton 1961), teachers with more experience and better verbal ability (Owen 1972, 1974; Sexton 1961), smaller classes (Sexton 1961), and financial support from local sources (Andrew and Goettel 1972). Kozol's (1991) account of racial and class inequality in school funding illustrated these realities in the contemporary era, showing how being of a minority or poor social-class status is often synonymous with attending a school that is dilapidated, overcrowded, unsafe, and unhealthy. But how and why might inequality in spending, including that which occurs within districts, be patterned by the racial and class composition of schools?

We believe that discrepancies in spending are at least partially driven by the fact that schools are dependent on federal, state, and local sources of revenue. While federal alloca-

tions (e.g., Title I) and related distributional dynamics rely on specific policy formulas, local school boards often exercise discretion in the allocation of local funds, with implications for within-district variation. And, there is good sociological reason to expect that such discretion at the local level may reflect and reinforce local stratification patterns—specifically class and racial inequality. We know, for instance, that local political processes (including school board membership and decision making) are vulnerable to local stratification arrangements and that education as a social institution is embedded within and shaped by these very dynamics (Brooks-Gunn, Duncan, and Aber 1997; Roscigno 1995, 2000). Assuming the lack of significant mobilization aimed at challenging educational disparities in poor and minority communities, it is predicted that local political processes (and resource-allocation decisions) will fortify the status quo and thus tend to work in favor of more advantaged constituencies. Indeed, an earlier study (Andrew and Goettel 1972) found that poor and minority schools lacked financial support from *local* sources relative to higher-SES schools.

There may be several mechanisms at work in how these processes unfold, and preliminary qualitative analyses we conducted suggest that these mechanisms are, by no means, mutually exclusive. First, since school board members in most locales are elected officials, their decision making is likely to be shaped with a voting constituency in mind. Since poor and minority communities are more likely to be alienated from the political process and less likely to participate in it (Piven and Cloward 2000; Teixeira 1987), school board decision making is arguably shaped more by concerns and issues that are of relevance to the more affluent, voting public. Such a bias in decision making may occur without direct pressure from voters and parents, although parent and parent-teacher organizations from higher-SES, white schools tend to be more active and politically astute in pressing local school boards for resources (National Committee for Citizens in Education 1975; Reed 1982; Zeigler and Boss 1974).

Second, school boards often implement specific application processes for discretionary funds to be followed by schools. In the case of the district we studied, for instance, principals can submit proposals to the district once a year for discretionary local allocations (Columbus Public Schools 2000). There is, however, room for bias in decision making related to discretionary funds, despite the formality of such a process. Poorer schools are simply less organizationally and bureaucratically equipped to formulate—let alone submit—proposals for extra funds, particularly if they are overwhelmed with their day-to-day functioning and the more general maintenance of order. Furthermore, school boards may be more apt to reject proposals by poorer, minority schools, given that such schools are receiving extra allocations in the form of federal Title I funds. While our analyses do not model these processes directly, our findings on variation in spending by racial and class composition and the disentangling of federal versus local allocations speak clearly to these possibilities.

Why Spending May Matter

School-level analyses not only provide more accurate information on spending variation, but allow for the inclusion of specific school-level attributes that may mediate the spending-achievement relation. Educational dollars are spent on several different functions, and it is possible that money spent on one (e.g., instruction) may influence achievement more or less and through different mechanisms than may money spent on another (e.g., maintenance). Although some have acknowledged these possibilities separately (Elliott 1998; Roscigno 2000; Unnever et al. 2000; Wenglinsky 1997, 1998), few have closely analyzed the potential mediation of specific types of expenditures by intuitively related school attributes.

We posit that the most important function of spending is instructional. Instructional funds are used for teachers' salaries, textbooks, and various other material supplies related to classroom instruction. The district we analyzed reported that nearly 60 percent of its overall budget is appropriated for instructional purposes, the largest proportion

of which is for teachers' salaries (Columbus Public Schools 2000; see also Burke 1999). Furthermore, nearly all the elementary schools in the district spend more on instruction than on all other functions combined. For these reasons, we believe that instructional spending may be particularly influential in shaping achievement.

The primary mechanism through which we expect instructional spending to matter is the attraction of more highly qualified and trained teachers. Causality in this relation is somewhat difficult to establish, since schools with the most highly credentialed teachers naturally report higher instructional expenditures because such teachers typically earn higher salaries. At the same time, however, there remains strong reason and evidence to support the assertion that instructional expenditures and better school and classroom resources will attract more-experienced and qualified teachers. First, there is significant within-district migration of teachers in the United States. Our analysis of the 1994–95 *Teacher Followup Survey* component of the National Center for Education Statistics's *Schools and Staffing Survey* indicated that of the approximately 23 percent of teachers who moved from one school to another in the course of one year, *half* moved from one public school to another *within the same district*. Furthermore, our bivariate analyses of teachers' credentials in relation to schools' racial and class composition suggested that the most highly credentialed teachers are not randomly distributed within a district, but are concentrated in high-SES, white schools with, arguably, higher per-pupil expenditures.[1] Such schools may be more attractive to teachers because of real or perceived differences in quality or more tangible classroom resources that are tied to instructional expenditures (e.g., computers, books, and the availability of teacher's aides).

Spending on the maintenance of school buildings may also shape achievement through particular school-level mechanisms. Allocating more money to buildings should result in physical conditions that are more conducive to learning. Kozol (1991) emphasized the role of physical squalor in affecting a child's sense of worth, but the role of physical conditions in shaping achievement is unclear. We suspect that leaky roofs, crumbling walls, and unsanitary conditions are distractions from the learning process and that better physical conditions—shaped by spending—lead to higher achievement. Research on the impact of school finance reform in New Jersey and Kentucky has noted that low-SES districts, in particular, give high priority to remodeling or replacing old, dilapidated schools when sufficient funding becomes available (Adams 1994; Firestone et al. 1994). However, few analyses have been able to model systematically the potential links among spending, physical conditions, and achievement.

An additional possibility is that higher-spending schools are able to maintain a climate that is characterized by a greater degree of order and consistency among the student body (e.g., students' attendance rates), with clear implications for students' capacity to learn through either of the previously noted spending functions. For instance, to the extent that instructional expenditures shape the climate of classrooms, curricula, and the quality of teachers, one may find a link between instructional spending and achievement that is mediated by order and consistency among the student body itself. In this case, schools with higher instructional allocations may have better student-attendance rates, which unquestionably affect teachers' capacity to instruct and guide students effectively, not to mention to shape teachers' ability to maintain order in the classroom. In contrast, lesser instructional investment in classrooms may be a source of students' detachment, disengagement, and absence.

Spending on building maintenance similarly may influence students' attendance and engagement by shaping the broader physical context of the school that students attend. One can envision a greater likelihood of students' disengagement when walls are cracking, roofs are leaking, heaters are not working, and the school is generally not a comfortable place in which to be—let alone learn. Qualitative accounts (e.g., Kozol 1991) have noted such disengagement, particularly in inner-city areas of the United States, yet such analyses have seldom modeled these processes as a function of spending or in relation to achievement.

DATA AND MEASUREMENT

The school-level data used in this analysis represent 89 public elementary schools in the Columbus (Ohio) Public School District.[2] Columbus, with a population of over 700,000, is diverse in racial and class composition and thus provides a local research setting in which findings are relatively generalizable to other urban areas of the United States. Others have studied neighborhood disadvantage and urban crime in Columbus for reasons of diversity and representativeness (Krivo and Peterson 1996). Of the more than 65,000 students in the district, 57 percent are black and 39 percent are white, and only about 4 percent of the students are of other racial and ethnic backgrounds.

We constructed our measures from four major sources. The first is the Ohio Department of Education's "school building report cards," which are brief statistical summaries of each school in the state, including the results of achievement tests, that are published and sent to parents each year. The second is the Ohio Department of Education's Education Management Information System (EMIS) building/school profiles, a rich source of data on spending and certain school attributes. The third are data provided by the Columbus Public Schools Food Service Department on the social-class composition of the schools. Finally, we constructed a unique variable measuring the physical conditions of the schools from an analysis by an independent firm contracted by the district to evaluate each school (Planning Advocates, 1997). This report—and the data on physical conditions it offers—nicely complements the data on spending, school resources, and achievement. Achievement outcomes were measured for the 1998–99 school year, and the independent variables were measured for the 1996–97 school year. Table 1 presents descriptions of the variables, ranges, means, and standard deviations.

Dependent Variable

The dependent variable, academic achievement, was measured as the percentage of fourth graders in the school who passed the state proficiency test in five subject areas: reading, writing, math, science, and citizenship (see Table 1 for descriptions of the topics). As can be seen in Table 1, there is significant achievement variation among schools within the district, in that pass rates on the various tests range from a few percentage points to 100 percent. Despite the limitations of these measures, which include the inability to model variation within schools or how well students performed relative to the pass/fail cutoff, these measures are useful. They represent standardized tests within the district (and the state), the range of academic questions and topics covered are considerable, and they are nicely suited to our analytic focus on school-level variations in both spending and achievement. Furthermore, the significant variation of these achievement indicators across schools, combined with nearly identical standard deviations, give us confidence in their validity and use in our school-level analysis.

Spending

Total per-pupil expenditure refers to the total annual amount per student spent on all functions combined, expressed in thousands of dollars.[3] The range of 3.05 to 8.16 shows that there is indeed wide variation in spending across schools within the district. *Instructional per-pupil expenditure* measures the amount of money per student spent on actual classroom instruction. Again, there is wide variation across schools, as the range of 1.33 to 4.92 indicates. Rather than rely on these commonly used measures, which reflect federal, state, and local funds spent on all functions, we also used alternative measures that reflect local spending patterns for different functions.

Adjusted instructional per-pupil expenditure is our indicator of instructional funds derived from local sources. Federal allocations for Title I of the Elementary and Secondary Education Act (ESEA) of 1965 to each school were obtained from the Columbus Public School District's published budget.[4] The raw numbers were divided by the number of students in the school to produce a per-pupil Title I figure, which was then subtracted from the instructional per-pupil spending figure to

Table 1. Descriptions, Metrics, Means, and Standard Deviations for School-level Measures Used in the Analyses

Variable	Description	Metric	Mean	SD
Achievement				
Reading	Percentage of students who passed the proficiency test	8.90 to 100.00	38.15	19.37
Writing	Understanding of language and elements of fiction/poetry through summary, interpretation, inference, comparisons, predictions, and so forth			
	Variety in word usage and sentence patterns, punctuation, organization, vocabulary, capitalization, legibility of writing, and so forth.	10.70 to 95.80	50.23	19.28
Math	Missing numbers; addition, subtraction, multiplication, and division; add and subtract decimals; simple geometry; knowledge of currency; and so forth	3.00 to 87.50	27.44	19.37
Science	Categorization of organisms; observations; measurement of mass, dimensions, and volume; prediction of weather from maps; human nutrition; and so forth	2.60 to 100.00	29.04	19.05
Citizenship	History and change, cultural groups, geography and map skills, state and local governments, production and consumption, and so forth	9.10 to 100.00	45.94	20.31
Spending (in thousands of dollars)				
Total per-pupil expenditure	Total spending (from all sources) per pupil	3.05 to 8.16	5.40	.80
Instructional per-pupil expenditure	Spending on classroom instruction per pupil	1.33 to 4.92	3.50	.55
Federal Title I allocation per pupil	Federal ESEA Title I allocation per pupil	.00 to .76	.39	.21
Local				
Adjusted instructional per-pupil expenditure	Instructional per-pupil expenditure excluding Title I allocation	1.05 to 4.81	3.10	.58
Operations/maintenance per-pupil expenditure	Spending on building operations/maintenance per pupil	.47 to 1.45	.80	.20
Composition of the Student Body				
Percentage eligible for free or reduced-price lunches	Total percentage of students eligible for the free or reduced-price lunch program	26.00 to 99.00	66.47	20.41
Percentage nonwhite	Total percentage of nonwhite students	8.80 to 99.70	57.97	27.08
Potential School-level Mediators				
Physical condition	Scale of building-quality indicators; alpha = .89 (see Table 2)	38.75 to 82.25	59.05	8.41
Order/consistency	Students' attendance rate	87.80 to 96.70	93.39	1.84
Teachers' education	Percentage of teachers with at least master's degrees	6.30 to 83.30	34.90	15.75
Controls				
Prior achievement	Earlier measures of achievement detailed above			
Square feet per student	Ratio of square feet of space to number of students	61.81 to 192.87	108.13	26.27

yield "adjusted" instructional spending. Adjusted instructional per-pupil expenditure ranges from 1.05 to 4.81, indicating that the expenditure of local funds varies considerably by school.[5] *Operations and maintenance per-pupil expenditure* refers to the amount spent on operating and maintaining the school building. The range of .47 to 1.45 shows that schools vary considerably by how much is spent per pupil on this function as well. National studies typically implement a cost-of-education index to control for regional differences; however, since we focused on schools within a single district, no such control was necessary.

Class and Racial Composition

The Columbus Public Schools Food Service Department provided data on the *percentage of students who are eligible for free or reduced-price lunches.* We used this measure, reflecting the class composition of the student body, as a proxy for school SES. Its range of 26 percent to 99 percent and mean of 66.47 indicate that, overall, the schools in the district have relatively high percentages of poor students, although there is considerable social-class variation. The range of *percentage nonwhite* (8.8 percent to 99.7 percent, reported by EMIS) indicates notable racial segregation within the district.

Potential School-level Mediators

We also included several variables that may mediate the spending effects, noted previously, in the analyses. *Physical condition* of the school was constructed from the district report, which included ratings of each school on a number of dimensions, ranging from 0 to 100. In creating a scale indicator from these ratings, we focused on the attributes and environmental factors that are most immediate to the everyday experiences of staff and students (see Table 2): adequacy, safety, healthfulness, and appearance (combined and divided by 4).[6] Along with an alpha of .89, the correlations reported in Table 2 speak to the reliability of this scale. Given the range of 38.75 to 82.25, it is clear that there is considerable variation in school conditions within the district.[7]

Order/consistency was measured by the student attendance rate, with higher rates representing a higher degree of order and consistency in the school; these rates range from 87.8 to 96.7 with a mean of 93.39. *Teachers' education* refers to the percentage of teachers in the school with at least a master's degree. Again, there is considerable variation, with a range of 6.3 percent to 83.3 percent of teachers holding at least a master's degree.

ANALYTIC STRATEGY AND RESULTS

The analysis proceeds in two steps. First, we disentangle local and federal spending patterns and examine their associations with school racial and class composition. We expect that local discretionary spending may reproduce local stratification arrangements, for a variety of reasons discussed earlier. These findings, although not rigorous in a methodological sense, are important because they highlight that unequal spending may be fostered as much within districts as between districts.

In the second part of the analyses, we focus on the link between spending variation and achievement within the district, relying on ordinary least-squares (OLS) regression.[8] We then turn specifically to achievement. The first equations of the achievement models introduce local spending measures and their effects on the five achievement outcomes, with a second model introducing the potential school-level mediators. Reductions in spending effects, once school-level mediators are introduced, help address our concern about how and why spending may matter. Because of high levels of collinearity between racial and class composition and our local spending and other school-level predictors, racial and class composition could not be included in these achievement models. We address this limitation in two important ways.

First, we estimate parallel models (presented in the appendix) in which we regress the five achievement outcomes on total per-pupil expenditure while controlling for school racial and class composition. Collinearity with racial

Table 2. Descriptions of and Correlations between Components of the Physical Condition Scale

Component	Description[a]	Descriptives			Correlations		
		Metric	Mean	SD	Adequacy	Safety	Healthfulness
Adequacy	Measures the degree to which the size of the site, the school building itself, and the available equipment are satisfactory, given the number of students.	28 to 88	53.43	10.11	—		
Safety	"A function of those features of the school plant which make the building structurally sound and protect the occupants from hazards of traffic, fire, and accidents."	38 to 78	59.64	7.89	.582***	—	
Healthfulness	Indicates how well the building is able to "promote the good health of the building occupants" through such things as "lighting, heating, cooling, ventilation, and sanitation."	43 to 88	62.63	8.71	.747***	.691***	—
Appearance	"How the school looks and whether it is pleasing to the eye. Attention is directed to landscaping, color harmony, appropriateness of furnishings, and use of decoration."	35 to 87	60.52	11.57	.701***	.704***	.726***

*** $p < .001$ (two-tailed test).
[a] Quotations taken from Planning Advocates (1997).

and class composition is not a problem in these models. The consistency of spending effects in the appendix, relative to those reported in the text, highlights the robustness of our findings and generates greater confidence in our conclusions. Second, all achievement models control for subject-specific school achievement three years prior to the measurement of the dependent variable. This rigorous modeling strategy allows us to isolate spending effects temporally. It also bolsters our confidence that the spending effects we find are not a function of unmeasured individual student attributes (for which no data are available) or compositional disadvantages, both of which should be captured in the prior achievement measure. Throughout, we also account for potential effects of crowding by controlling for the ratio of *square feet per student.* Initial models also included average class size, but this measure was excluded from the final models because of its limited range of 14 to 25.7 and the fact that it did not have a significant impact on achievement in any of the regression analyses.

Variation in Spending and Racial and Class Composition

Is variation in spending within the district linked to patterns of racial and class stratification? In short, the answer is yes. Table 3 presents bivariate correlations between racial and class composition and all the spending measures. The correlations illustrate the importance of our operational decision to extract Title I allocations from the instructional per-pupil spending measure.

District-level analyses of inequality in school funding have typically found that economically disadvantaged districts spend less per student than do wealthier districts (Kozol 1991). Our analysis asks whether this pattern holds within a district—that is, whether schools with higher percentages of students who are racial minorities and eligible for free or reduced-price lunches have fewer resources than do schools with more white and economically advantaged students. There were no statistically significant bivariate correlations between racial and class composition and either total per-pupil expenditure or instructional per-pupil expenditure. Once Title I money is extracted from the instructional spending figure, however, significant negative correlations between *adjusted* instructional per-pupil expenditure and percentage who are eligible for free or reduced-price lunches ($r = -.310$, $p < .01$) and percentage nonwhite ($r = -.170$, $p < .10$) are apparent. In addition, the percentage who are eligible for free or reduced-price lunches is negatively correlated with operations and maintenance per-pupil expenditure ($r = -.368$, $p < .001$).

Figures 1 and 2 illustrate these patterns graphically. Average spending figures were calculated for schools with low, medium, and high proportions of poor and minority students.[9] The gray bars in the figures show the variations by class composition; note that the bars consistently become shorter from left to right. Schools with the lowest proportions of poor students spend $790 more of local instructional funds per pupil than do schools with high proportions of poor students.

Table 3. Zero-order Correlations between Racial and Class Composition and Spending Measures

	Percentage Eligible for Free or Reduced-price Lunches	Percentage Nonwhite
All Sources		
Total per-pupil expenditure	-.085	-.035
Instructional per-pupil expenditure	.043	.028
Local Sources		
Adjusted instructional per-pupil expenditure	-.310**	-.170+
Operations/maintenance per-pupil expenditure	-.368***	-.061
Federal Title I Allocation per Pupil	.949***	531***

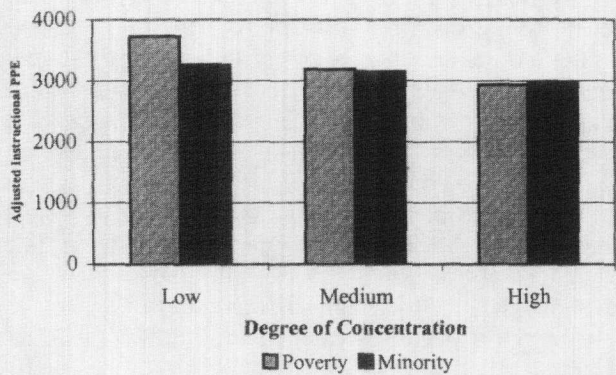+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (one-tailed tests).

Figure 1. Adjusted Instructional Per-pupil Expenditure (PPE) by Degree of Poverty and Minority Concentration
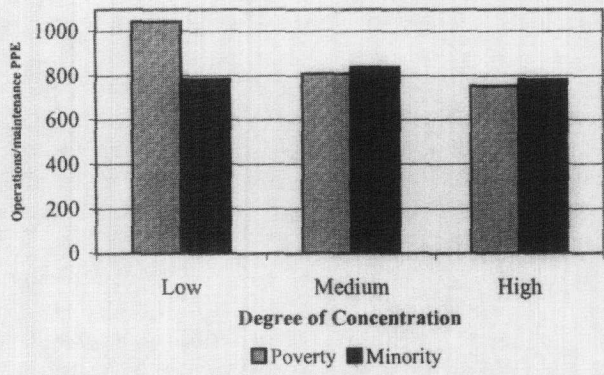

Figure 2. Operations/Maintenance Per-pupil Expenditure (PPE) by Degree of Poverty and Minority Concentration
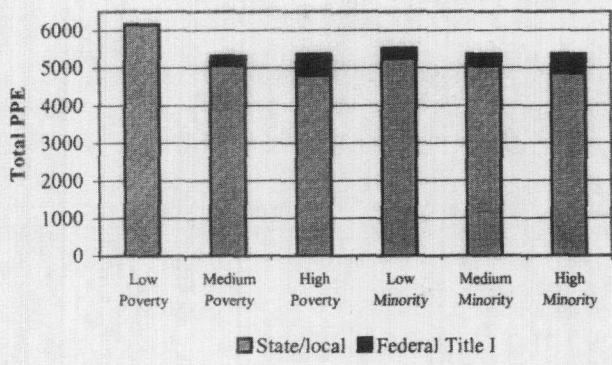

Figure 3. State/Local and Federal Title 1 Funds as a Percentage of Total Per-pupil Expenditure (PPE) by Degree of Poverty and Minority Concentration

Although a gap of $790 per student may not seem large, consider that the average high-poverty school in this district has 383 students and thus that, somehow, the district is investing $302,570 less per year in instruction at the average high-poverty school than at a low-poverty school of the same size. We therefore consider this gap to be educationally meaningful, given what an extra $300,000 could buy for a school. The class disparity in operations and maintenance spending is $290 per student. The black bars in Figures 1 and 2 show the variations by racial composition, which are not as pronounced as are the class disparities. Nonetheless, $277 more per pupil of local instructional dollars are spent in schools with low proportions of minority students than in those with the highest proportions.[10] These findings provide evidence of a local dynamic through which fewer local financial resources are allocated to schools with higher proportions of poor and minority students.

Figure 3 further illustrates this point by breaking down the total per-pupil expenditure into two components: adjusted instructional per-pupil expenditure and Title I money per pupil. It shows that the percentage of total spending coming from local sources declines as both poverty and minority concentration increase, as the lighter portions of the bars become shorter from left to right. The correlations in Table 2 between Title I allocation and racial and class composition ($r = .531$ and .949, respectively; $p < .001$), as well as the fact that the darker portions of the bars in Figure 3 become larger from left to right, suggest that federal dollars do reach their intended destination. If the lighter portions of the bars lined up, it would suggest an equal distribution of resources locally, allowing the Title I money to boost disadvantaged schools to higher levels of total per-student spending. Given the unequal distribution of *local* resources, however, the federal funds are not able to bring the disadvantaged schools up to the level of *total* per-student spending found in disproportionately white and higher-SES schools. Title I money, in other words, does not make up for existing local inequality in the allocation of resources.

The patterns reported here are consistent with those found in early work that linked variation in within-district spending to the racial and class composition of schools (Owen 1972, 1974; Sexton 1961) and that demonstrated that higher-SES schools receive more funding from local sources (Andrew and Goettel 1972). The presence of these patterns in our data illustrates the persistence of educational inequality at the local level—a pattern that has continued for a number of decades and raises questions about the local control of education. It seems as though, at least in this district, local control means separate and unequal. That is, local control allows for the persistence of a degree of segregation by race and class and for the unequal distribution of local resources on the basis of the racial and class composition of the schools.

Consequences for Achievement

Does this variation in local spending have an impact on potentially influential attributes of schools? We address this question by regressing our potential school-level mediators on the local spending measures, controlling for school crowdedness (see Table 4). Clearly, schools' physical conditions improve as more money is spent on operations and maintenance ($b = 22.080, p < .001$), consistent with our earlier prediction. The degree of order/consistency in the schools also increases as more resources are invested, both in terms of local instructional spending ($b = .764, p < .05$) and operations/maintenance spending ($b = 4.544; p < .001$). This finding is also consistent with our earlier prediction that the investment of resources will foster higher student attendance rates (and, likely, greater continuity and order in the learning process). Notably, both forms of spending matter in this regard. This finding suggests that investments in both classrooms and schools more generally matter for students' engagement.

The quality of teachers also appears to be influenced by both spending measures. As adjusted instructional per-pupil spending increases, so does the percentage of teachers with at least master's degrees ($b = 4.626, p < .10$). Although this association may be somewhat reciprocal, since higher salaries for

Table 4. Unstandardized OLS Estimates of School-level Mediators on Spending Measures

	Physical Condition	Order/ Consistency	Teachers' Education
Adjusted instructional per-pupil expenditure	1.399	.764*	4.626+
Operations/maintenance per-pupil expenditure	22.080***	4.544***	24.803**
Square feet per student	-.134***	-.033***	-.105+
Constant	51.529	90.915	12.113
Adjusted R^2	.250***	.284***	.094**

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$ (one-tailed tests).

teachers with master's degrees result in higher instructional spending, we suspect that teachers' migration to schools with greater instructional resources and more well-to-do student bodies is also an underlying process (see note 1). Notably, schools that spend more on operations and maintenance also have higher proportions of teachers with at least master's degrees ($b = 24.803$, $p < .01$). Not only are such schools likely to be in better physical condition, but they are in "better" neighborhoods—a potential magnet for teachers with seniority, credentials, and thus the potential for mobility within the district.

What are the consequences of unequal spending for achievement? Table 5 models the five achievement outcomes as a function of spending and school-level mediators. Equation 1 tests for the overall effects of the two spending variables. Equation 2 adds the potential school-level mediators, testing for reductions in spending effects that will help us address how and why spending matters. We control for prior achievement and the degree of crowdedness in all models, thus temporally isolating spending effects and controlling for possible background and compositional disparities.

These analyses reveal two clear patterns. First, schools that spend more exhibit higher levels of academic achievement. Both spending measures have a positive effect on achievement in Equations 1 and 2 across all outcomes. A $1,000 increase in local instructional spending per student leads to from about 6 percent to about 10 percent more students passing the proficiency tests. (The exception is writing achievement, for which the spending effect fails to reach statistical significance in Equation 2—a finding we

interpret later.) To illustrate the magnitude of these effects, consider that the range of local instructional spending is nearly $4,000 per student. Thus, if the lowest-spending schools were locally funded at the level of the highest-spending school, the percentage of students passing the tests could increase 24 percent to 40 percent, depending on the test. The strength and consistency of the link between spending and achievement are further explored in the appendix. In these analyses, we replicate the first model but replace the two local-spending measures with total per-pupil expenditure while controlling for school racial and class composition. The effect of total per-pupil expenditure is somewhat weaker than the effects of the local spending measures, but is nevertheless consistent and remains significant even with controls for racial and class composition.

In Table 5, the effects of both spending variables are partially or completely mediated with the inclusion of school-level mediators in Equation 2. Declines in the effects of spending when physical condition, order/consistency, and teachers' education are included suggest that spending matters partially through these mechanisms. On the basis of the linkages reported in Table 4, it is no surprise that operations/maintenance per-pupil expenditure loses any significant effect it may have exerted in Equation 1. The conclusion is that spending on school maintenance does not directly affect achievement; rather, such spending matters through its effects on a school's physical condition, order/consistency, and the quality of teachers.

The effect of adjusted instructional per-pupil expenditure also declines in Equation 2 for each of the five achievement outcomes.

Table 5. Unstandardized OLS Regression Estimates of Achievement Measures on Spending and School-level Mediators

	Reading		Writing		Math		Science		Citizenship	
	1	2	1	2	1	2	1	2	1	2
Adjusted instructional per-pupil expenditure	8.229*	6.273*	6.216*	3.723	9.613**	8.606**	9.225**	7.222*	11.222**	9.591**
Operations/maintenance per-pupil expenditure	21.120*	1.998	17.049+	-6.603	13.612+	1.902	19.861*	2.362	16.495+	-2.466
Physical condition		.616**		.602**		.365*		.384*		.520*
Order/consistency		3.165***		3.036**		1.764+		2.922**		3.513**
Teachers' education		.094		.128		-.000		.082		-.033
Prior achievement	.531***	.171	.567***	.315*	.725***	.573***	.524***	.317*	.529***	.283*
Square feet per student	-.052	.086	-.094	.045	-.074	-.001	-.089	.030	-.152*	-.030
Constant	-12.287	-331.884	9.844	-294.237	-22.896	-200.840	-15.764	-302.859	-2.280	-345.141
Adjusted R^2	.344***	.445***	.290***	.411***	.492***	.515***	.357***	.432***	.407***	.486***

$+ p < .10$, $* p < .05$, $** p < .01$, $*** p < .001$ (one-tailed tests).

Although we predicted that such spending would matter partially through teachers' education, teachers' education fails to reach statistical significance in these models. It makes sense, then, that the effect of instructional spending declines less dramatically relative to the declines in operations/maintenance spending, especially given the patterns reported in Table 4.[11]

With regard to the mediators, better physical conditions and a higher degree of order/consistency both promote achievement in all measured subject areas. Although the effect of physical condition is moderate—a 10-point increase on the scale would lead to about 6 percent more students passing the reading test, for example—the range of the physical condition scale (38.75 to 82.25) indicates that every school is *at least* almost 20 points away from a perfect rating of adequacy, safety, healthfulness, and appearance. In other words, there is plenty of room for improving the conditions of the school buildings, which Firestone et al. (1994) and Adams (1994) found to be a high priority for low-SES districts that received increased funding because of school finance reform in New Jersey and Kentucky. Our findings suggest that such improvements promote higher achievement. A higher degree of order/consistency in the learning environment also promotes achievement, since a 1 percent increase in the student attendance rate results in about 3 percent more students passing the proficiency tests.

CONCLUSION

This study has addressed the disparities in spending within a large, urban school district, their associations with racial and class composition, and the consequences of such patterns for school attributes and achievement. This focus is unique, since most analyses of spending have tended to rely on and be constrained by district-level data. Our analyses of 89 elementary schools highlight the importance of local dynamics. Specifically, inequality in spending appears to correspond to the racial and class composition of schools. Schools with the highest proportions of poor

students are particularly disadvantaged, while race is somewhat less salient. This inequality appears to be a result of an allocation dynamic through which fewer *local* dollars land in high-poverty schools, weakening the intended compensatory effect of federal Title I funds. Furthermore, we found that higher spending promotes achievement through particular school resources. Instructional spending from local sources and operations/maintenance spending both promote achievement through the school's physical condition and the degree of order/consistency in the learning environment.[12]

Evidence of inequality in within-district spending reveals a problem that goes beyond the notion that the reliance on local property taxes to fund schools generates unequal spending. The disparities in spending reported here are substantial and educationally meaningful. Although unequal spending within districts has received comparatively little attention in legal cases and the sociology and education literatures, such disparities clearly warrant more attention. Future research should thus continue this line of inquiry and press the fundamental and sociological question of *why*.

For research on within-district inequality to mature, school-level data must become more widely available and more easily accessible. Picus (1997:319) reported that there is a "tremendous diversity in reporting systems across districts within and across states." The collection of uniform school-level expenditures and other measures by districts and/or states will allow for further exploration of within-district allocation dynamics, such as those found in this study. We also suspect that local historical and qualitative analyses will be especially informative, given their ability to tap into and delineate micropolitical dynamics pertaining to school boards' decisions; teachers' migration patterns; and, ultimately, how spending affects students on a concrete, day-to-day level. Together, such strategies will allow researchers to test our suspicion that the patterns we uncovered are more the rule than the exception.

The analysis of the link between spending and achievement at the school level is in its infancy, although such studies will undoubt-

edly become more common as more data become available. It is our hope, for example, that future national surveys will be able to record school-level measures of expenditures and other attributes to complement their formidable measurement of student-level characteristics. The inclusion of school-level spending measures in nationally representative surveys, such as the National Education Longitudinal Study and the Early Childhood Longitudinal Study–Kindergarten Cohort, for example, would significantly improve researchers' ability to explore the mechanisms through which spending promotes achievement.

Beyond informing future research, our analyses and findings also speak to more general stratification and political accounts of inequality, group disparity, and opportunity. Indeed, the allocation of local resources by school boards is a political process, typically driven by elected and appointed officials. Relevant action may be formal and procedural or more informal. The published information for this district indicates that schools submit budget requests that must be approved at several levels as part of the budgetary process. It is possible that the potential discretion in funding these requests may advantage higher-SES schools because of (1) conscious decisions by local leaders that are race- and class discriminatory; (2) the likelihood that higher-SES parents have more influence on local political entities, such as the school board; and (3) the likelihood that higher-SES schools are more bureaucratically and politically coordinated when it comes to writing and submitting such proposals.

The racial and class composition of schools, which is associated with educational resources, is also shaped by political decision making to some degree. The Columbus Public School District, for instance, systematically ended its policy of busing to achieve racial integration after the 1995–96 school year. Local newspaper accounts discussed the "return to the concept of neighborhood schools" and how this process has contributed to the emergence of a "new segregation" (Bush 2000b). Although this situation is certainly relevant to racial and class stratification and the distribution of resources in

Columbus specifically, it is a larger, national pattern—a "quiet reversal of *Brown v. Board of Education*" (Orfield et al. 1996) that has implications for disparities in spending and achievement between and within many urban districts throughout the United States.

NOTES

1. In the district we analyze here, for instance, the correlation between the percentage of teachers with master's degrees and the percentage of students who receive free or reduced-price lunches is $r = -.379$ ($p < .001$). The correlation with percentage non-white is $r = -.252$ ($p < .05$). This finding suggests to us that to the extent that there is within-district migration of teachers, particularly those with seniority and higher credentials, it will be toward more affluent schools.

2. Two schools were excluded from our analyses because of missing and/or questionable data on one or more measures.

3. All spending variables used in the analyses are measured in thousands of dollars.

4. Title I of the ESEA extended federal financial support of education to the elementary level, with the specific goal of enhancing the educational opportunities of economically disadvantaged students. For a summary of Title I, see Spraggins (1968).

5. We subtracted Title I money from instructional per-pupil expenditure because such federal funds specifically target programs that are consistent with instruction, as opposed to other spending functions. Others have used a similar measure of instructional spending (see Owens and Maiden 1999; Unnever et al. 2000). The flow of Title I funds to instruction suggests that operations and maintenance per-pupil expenditure is a measure of spending from more local sources.

6. The measures excluded from the scale are accessibility, flexibility, efficiency, and expansibility. The accessibility rating is a function of how close to most of the student body the school is located and how easily the building can be accessed both in terms of the roads and the building's features that affect its accessibility. The flexibility rating refers to how well suited the building is to internal

changes. The efficiency rating is a reflection of the degree to which the building is able to conserve energy. The expansibility rating indicates how well suited the building is for enlargement.

7. This variation is likely to be a function of the age of the buildings. The oldest schools were constructed in 1874, 10 schools were built before 1900, and one-fourth of them were built before 1925.

8. Since we are primarily interested in the effects of spending and general patterns of mediation, our analyses use OLS regression with the inclusion of mediators simultaneously. Future research may more systematically explore the specific contribution of mediators using path analysis/structural equation modeling.

9. The low, medium, and high categories were created such that low refers to schools with 33 percent or less of their students receiving free or reduced-price lunches, medium represents schools with 34 percent to 66 percent of their students on free or reduced-price lunches, and high represents schools with 67 percent or more of their students on free or reduced-price lunches. For minority concentration, the categories represent the same percentage groupings of students who are nonwhite.

10. In Figures 1 and 2, comparisons of means for low-poverty schools to medium- and high-poverty schools are statistically significant at the .05 level. In Figure 1, comparisons of means for schools with low and high minority concentrations are significant at .05. In Figure 2, comparisons of means for racial composition are not significant.

11. One piece of evidence suggests that instructional spending matters partially through teachers' education. Instructional spending loses statistical significance in Equation 2 for writing, when the effect of teachers' education is the strongest and the increase in the adjusted R^2 from Equation 1 to Equation 2 is the largest. Separate models including only one mediator at a time revealed that only in the case of writing achievement did the effect of teachers' education reach statistical significance. We thus suspect that teachers' education is especially mediating the effect of instructional spending

in Equation 2 for writing and that the positive effects of order/consistency mediate the effect of instructional spending across the board.

12. Our analyses of the effects of spending are, arguably, a conservative test, given that privately contributed money (e.g., fund-raisers, PTA) are typically not calculated or reported in budgetary or per-pupil spending figures. Indeed, a local newspaper account reported that one school spent almost $70,000 in privately contributed money in 1999, while another raised only $200 to $500 per year (Bush 2000a). In addition, the district does not track private donations of material goods, such as computers and books (Lane and Bush 2000).

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APPENDIX

Unstandardized OLS Estimates of Achievement on Total Per-pupil Expenditure and Measures of Student Body Composition

	Reading	Writing	Math	Science	Citizenship
Total per-pupil expenditure	5.301**	3.565+	7.038**	5.706**	6.201**
Percentage eligible for free or reduced-price lunch	-.583***	-.456***	-.369***	-.555***	-.550***
Percentage nonwhite	-.153**	-.145*	-.112*	-.134*	-.133*
Prior achievement	.031	.224*	.403**	.066	.141
Square feet per student	.010	-.060	-.083	-.032	-.111+
Constant	55.232	69.186	19.566	45.098	64.281
Adjusted R^2	.624***	.511***	.589***	.596***	.595***

+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (one-tailed tests).